

RCA Institutes, Inc
132 West 31st Street | New York, NY 10001



RCA

T NELSON SYS CONSULT
BOX 1546
POUGHKEEPSIE N Y 12603



Bradford I. Daggett
Director
Institute for
Professional Development

Dear Engineer:

Are you faced with the design or evaluation of a communications system or sub-system?

Do you make system decisions? For example, what modulation scheme should be used? What is the optimal coding method?

If these questions represent areas of your concern, we feel we can help you.

To this end an intensified seminar for engineers like yourself has been developed.

The overall questions which the seminar undertakes to answer for you are:

Why Digital Communications?

How should various signals be processed for optimum reliability?

What types of codes are available and under what conditions is each most effective?

How can signals be extracted from heavy noise?

How can the revolutionary concepts of Information Theory benefit the communications engineer?

If you are interested in strengthening your capabilities in the design and evaluation of Communications hardware, I invite you to join us.

DIGITAL COMMUNICATIONS

A Concentrated Educational Program

Presented By The

RCA Institute for Professional Development

The Time is Urgent

Most of the important developments in digital communications have come about in recent years. Every month, every week, new techniques are introduced.

Are you keeping up? You are not alone if you are finding it difficult - But keeping up-to-date is our job.

Our experienced staff maintains contact with 'what's happening' in industry. We make it our job to search out and convey to you many of the latest engineering techniques.

We read for you the voluminous periodicals, digest the information, evaluate it and lucidly present it to you in just five days.

The Seminar

To maximize your return, practical and intuitive engineering techniques are emphasized, such that the results may be immediately job applicable.

Special lecture materials have been prepared to relieve you of much of the burden of note taking.

Modern audiovisual techniques are used throughout the program which is presented by two members of the Institute for Professional Development.

We can promise you a week of hard work, but we believe that you will find it interesting and rewarding.

Schedule

The action starts on Monday and continues daily through Friday from 8:30 a.m. to 4:30 p.m.

A handy reference flier has been enclosed as a travel and reservation guide which also details for you the location and dates.

Background of the Institute

The Institute for Professional Development is part of RCA Institutes, one of the oldest and largest schools of its kind in the United States.

High level Seminars are offered in both the Technical and Managerial profession by the Institute for Professional Development. In the Technical field, its goal is to increase the proficiency of engineering personnel by providing information and techniques that are of immediate value. This is accomplished through vertical educational programs of high intensity offering depth to the subject while emphasizing the practical application of various engineering techniques.

It would be hard to find a blue-chip corporation from A T & T to Xerox, which has not turned to the Institute for Professional Development for special training of its people.

Prerequisites

The depth and pace of the program requires that you have a bachelor's degree in mathematics, engineering or physics or the equivalent.

Engineering experience in related areas may be substituted for the minimum educational requirements.

Registration Information

Because of the personalized type instruction, we are forced to limit registrations. We will accept applications in order of receipt, first come/first served. For this reason, we suggest you apply immediately.

The fee is \$350.00 and includes your attendance, lecture materials and luncheons.

In conclusion, let me repeat. Digital Communications is a rapidly advancing field. Are you keeping up?

Our files contain many letters from past attendees acclaiming the value of this seminar to them. We believe we can also help you.

Phone us or mail the enclosed application today.

Sincerely,

RCA INSTITUTES, INC.

B. I. Daggett

Bradford I. Daggett, Director
Institute for Professional
Development

REQUEST FOR SEMINAR REGISTRATION(S)

To: RCA INSTITUTES, Inc.

Institute for Professional Development

132 West 31st Street, New York, N.Y. 10001

REGISTRATION RATE FOR 5-DAY SEMINAR: \$350.00

DIGITAL COMMUNICATIONS

NEW YORK, N.Y.

October 28 - November 1, 1968

☐ Purchase Order Enclosed

☐ Check Enclosed

☐ Bill Company

☐ Bill Me

Please register the following persons for the seminar, indicated above.

NAME _____

TITLE _____

NAME _____

TITLE _____

NAME _____

TITLE _____

AUTHORIZED BY _____

signature

title

FIRM'S NAME AND ADDRESS _____

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Please make checks payable to RCA Institutes, Inc.

A partial list of the companies that have sent personnel to attend our seminars

Aerospace Corporation
American Machine and Foundry Co.
The Bendix Corp.
Bell Telephone Laboratories, Inc.
The Boeing Company
Brown Engineering Co. Inc.
Chevron Research Co.
Colgate-Palmolive Co.
Columbia Broadcasting System, Inc.
Continental Oil Co.
Corning Glass Works
Douglas Aircraft Co. Inc.
E. I. Dupont DeNemours & Co.
Eastman Kodak Co.
Electronic Communications Inc.
Fairchild Camera and Inst. Corp.
Ford Motor Company
General Dynamics Electronics
General Electric Co.
General Motors Corp.
General Instrument Corp.
General Precision Equipment Corp.

Grumman Aircraft Engineering Corp.
Hamilton Standard
Hazeltine Corp.
Honeywell Inc.
ITT-Gilfillan Inc.
Johns Hopkins University
Jarrell-Ash Company
Leeds & Northrup Co.
Lockheed California Co.
The Magnavox Company
McDonnell-Douglas Corporation
Motorola Semiconductor Products Division
MIT
North American Aviation Inc.
North Electric Co.
Pan American World Airways
Philco-Ford
Pitney-Bowes, Inc.
Procter & Gamble Co.
RCA
Raytheon Co.
Rockwell Manufacturing Co.

The Ryan Aeronautical Co.
Shell Development Company
The Singer Co.
Sperry Rand Corp.
Sundstrand Aviation
Sylvania
Teletype Corporation
Texaco Research Labs.
The Budd Co.
The Mitre Corp.
United Air Lines
United Aircraft Corp.
Uniroyal Chemical Co.
University of California
Varian Associates
Westinghouse Electric Corp.
Western Electric Co.
The Western Union Telegraph Co.
Western Electric Co. Inc.
Xerox Corporation

... and many, many others

Seminar Location



For your convenience, we have selected the Hotel New Yorker for the presentation of our seminar, Digital Communication.

Located in midtown Manhattan, the New Yorker is famous for its accommodations, cuisine and hospitality.

Location: The Hotel New Yorker
8th Avenue and 34th Street
New York, N.Y. 10001

Dates: October 28 — November 1, 1968
8:30 a.m. to 4:30 p.m.

For room reservations call the New Yorker directly. Telephone (212) 563-1000.

Telephone answering service will be provided during seminar hours.

RCA

Registration Information

Registration Policy . . .

Seminars will be limited in size, and registrations will be accepted in the order received. Substitution of applicants may be made any time prior to the opening of the seminar. Additional registration information may be obtained by phoning our registrar's office - (212) 689-7200 extension RR 884. Tentative registrations will be accepted by phone with space being reserved until the necessary paper work can be completed.

Cancellation Policy . . .

Cancellation of registration will be honored and entire fee refunded, if written notification is received no later than two weeks prior to the seminar. A fee of \$25.00 will be charged for other cancellations.

Registration Fee . . .

Registration fee of \$350.00 includes attendance, luncheons, coffee breaks and a complete package of reference material. The reference material will be issued at the opening session and is available only to seminar participants.

Hotel Accommodations . . .

RCA Institutes has reserved a block of rooms in each seminar hotel. Your hotel room is not included in the registration fee. Please arrange your own room accommodations directly with the hotel, with reference to RCA Institutes' seminar.

Digital Communications

Prerequisites

If you have a baccalaureate degree in mathematics, engineering, or physics, you are eligible to attend. Practical engineering experience in the area related to the seminar may be substituted.

The Planning Board

This seminar has been developed through extensive field research by the Institute for Professional Development in consultation with RCA Institutes' Board of Technical Advisers, representing various technical research and educational activities of RCA and its subsidiaries.

The People that Make it Happen . . .

B. I. Daggett	Director
J. H. Sneddon	Manager, Administration
D. B. Kenney	Industrial Sales
B. V. Ferguson	Direct Marketing
M. V. Mahoney	Research & Develop.
A. B. Peticolas	Administrator
C. F. Panati	Group Leader
C. L. Pearce	Staff Member
P. V. Pennisi	Staff Member
C. H. Saville	Staff Member
A. M. Sutton	Staff Member

Each lecturer is dedicated to the profession – is recognized in his field and is an accomplished teacher. Each not only has a firm grasp of the material, but is well trained in the techniques of effective presentation.

RCA Institutes, Inc.

Institute for Professional Development
132 West 31st Street
New York, New York 10001

Please reserve a place for me at your five-day seminar on DIGITAL COMMUNICATIONS at _____

My understanding is that the registration fee of \$350.00 includes attendance, materials and noon luncheons.

Name _____

Firm _____

Address _____

Zip Code _____

Title _____

☐ Enclosed is my check

☐ Please bill my firm

I should like to bring along _____ of my key men, subject to the rates and prerequisites quoted in this folder. You'll find their names and titles in the attached memo.

Digital Communications



A Syllabus on the Content of

Digital Communications

A Five-day Educational Seminar
For Engineers Presented by
RCA Institutes

Digital Communications

The Purpose of the Seminar:

1. To convey practical design criteria for the digital hardware at either end of a data link.
2. To provide you with a current overview of the field.
3. To help you understand the capabilities of digital communications systems.
4. To inform you of the limitations of contemporary digital communications techniques.
5. To educate you in the practical applications of information theory.
6. To enhance, through education, your present position.

The Program

In return for just five days of involvement, we think we can promise you several new approaches to engineering design. You'll be reaping the rewards of our extensive research and development efforts.

The entire program is structured to present techniques that you may apply immediately to practical engineering design.

You participate in an action-filled environment of lecture, discussion and exercise. This presentation, which includes extensive use of audio-visual materials, has been widely acclaimed for its unusual clarity and fast-moving pace.

A glance at the topic headings reproduced from our lecture notes illustrates the comprehensive program we have planned for you.

Table of Contents

Introduction to digital communications
Definitions, Detailed block diagram,
Digital transmission of analog data

Multiplex transmission
Linear addition, Orthogonal coding,
Polarization, Frequency division, Time
division

Review of signal spectra
Common waveform spectra, Useful
Fourier facts, Pulse train spectra,
Harmonic components, Harmonic
distortion

Sampling
The sampling process, Spectrum
definition

Sampling theory
Interpolation ambiguity, Sampling low
pass signals, Sampling band pass
signals, Sampling distortion

Exercise I

Analog-digital conversion
D/A Kirchhoff adder, D/A ladder,
A/D ramp converter, A/D feedback
converter

Sources and information
Amount of information, Entropy of
independent joint events, Dependent
events, Probability-Entropy
diagrams, Information theory and pointing

Exercise II

Quiet channels
Channel capacity, Symbols of equal
duration, Bandwidth limited channels,
The Nyquist bandwidth, Systems
rates, Quiet channel coding

Noisy channels
Channel capacity – dispersion and
equivocation, Binary symmetric
channels, Gaussian white noise,
Slicing level, Error probability,
Minimum word length, Channel
capacity – fixed bandwidth, Channel
capacity – variable bandwidth, Summary

Exercise III

Unequivocal signals
Analog case, Digital case, Hamming
distance

Coding
Gaussian white noise, Parity, Exact
count code, Error correcting code,
Error analysis of codes

Writing binary digits

Modulation I: Review
Amplitude modulation, Single
sideband, Carrier suppression,
Exalted carrier modulation, Angular
modulation, Multiple sidebands,
Bandwidth and noise

Modulation II: Pulse modulation
Pulse – amplitude modulation: Pulse –
time modulation, Pulse – code
modulation, Pulse spectra

Exercise IV

Coding for noise
Moderate noise, Binary correlation,
Analog correlation, Orthogonal
codes, Transorthogonal codes

Coding for impulse noise
Multiple parity, Diversity circuit,
Interlacing

Pseudo-random codes
Pseudo-noise codes, Linear sequences

Shift registers
Chain codes, State diagrams,
Generating linear sequences, Chain
code generation, Generating binary
sequences, Pseudo-noise coding

Separating codes from noise
An improved correlator for PSK,
Correlation phase lock, Reducing
correlation time

Entropy Table

Bibliography

The seminar notes are comprised of 133
printed pages and are available only
to seminar participants.